OBSERVATIONS ON THE FLOWERING OF SOME SPECIES FROM THE NATURAL FLORA OF SIBIU (TRANSYLVANIA, ROMANIA) IN THE PERIOD 2005-2024

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ABSTRACT

The author observed, over 20 years, the flowering phenophase of 330 species of the natural flora of Sibiu in order to highlight the annual variations of this phenophase. In the tables inserted in the paper, the researched species, the date of flowering of the first specimens, the number of years in which they were seen and, in some cases, the thermal index and the date of mass flowering are noted.

Some comments are made regarding the number of days after the appearance of the first individuals with flowers and mass flowering (over 50% of plant individuals). The observations were made in many of the cases in the same places so that some of the environmental factors (e.g. substrate, soil, exposure, inclination, altitude, biocenosis) did not change. Thus, the flowering phenophase depended mainly on temperature and rainfall.

REZUMAT: Observații asupra înfloririi unor specii din flora spontană a municipiului Sibiu (Transilvania, Romania) în perioada 2005-2024.

Autorul a observat, timp de 20 de ani, fenofaza înfloririi a 330 de specii din flora spontană a municipiului Sibiu pentru a evidenția variațiile anuale ale acestei fenofaze. În tabelele inserate în lucrare sunt notate speciile cercetate, data înfloririi primelor exemplare, numărul anilor în care acestea au fost văzute și, în unele cazuri și indicele termic și data înfloririi în masă.

Sunt făcute unele comentarii referitoare la numărul de zile de la apariția primelor exemplare cu flori și înflorirea în masă (peste 50% dintre fitoindivizi). Observațiile au fost făcute în multe dintre cazuri în aceleași locuri pentru ca unii dintre factori (ex. substratul, solul, expoziția, înclinația, altitudinea, biocenoza) să nu se schimbe. Astfel fenofaza înfloririi a depins, în principal, de temperatură și precipitații.

RÉSUMÉ: Observations sur la floraison de quelques espèces de la flore spontanée de Sibiu (Transylvanie, Roumanie) en 2005-2024.

L'auteur a observé, pendant 20 ans, la phénophase de floraison de 330 espèces de la flore spontanée de la zone de Sibiu afin de mettre en évidence les variations annuelles de leurs phénophase. Dans les tableaux insérés dans l'article, les espèces étudiées, la date de floraison des premiers spécimens, le nombre d'années pendant lesquelles elles ont été observées et, dans certains cas, l'indice thermique et la date de floraison massive sont notés.

Quelques commentaires sont faits concernant le nombre de jours après l'apparition des premiers spécimens avec des fleurs et la floraison massive (plus de 50% des phytoindividus). Les observations ont été faites dans de nombreux cas aux mêmes endroits de sorte que certains des facteurs (par exemple, le substrat, le sol, l'exposition, l'inclinaison, l'altitude, la biocénose) n'ont pas changé. Ainsi, le phénophase de floraison dépendait principalement de la température et des précipitations.

INTRODUCTION

Phenology is a branch of biology that studies the seasonal changes (appearances) of plants and animals generated by climatic factors (especially temperature and rainfall) of each season, which occur in fauna and flora (flowering, fruiting, migration, etc.). It provides data for the preparation of bioclimatic maps, used in ecology, biogeography, climatology, etc.

There is a diversity of phenologies by taxonomic groups, our theme being in plant phenology, a field that highlights the phenophases, the stages, through which plant species go in their development, the periodicity of transformations under the influence of environmental factors from germination/sprouting to budding, foliation, flowering and up to fruiting and seed dispersal.

The territory where the observations were made was the municipality of Sibiu, and the time period 2005-2024.

MATERIAL AND METHODS

The beginning of flowering is noted after personal observations in the field, and the thermal index and the calculated mass flowering were contributed by professor Mihai Buiuc.

The concerns of flowering phenology date back to Transylvania in the nineteenth century, the best known being those of Reisenberger L. from 1853 and 1869 (in Sibiu) and of Salzer M. from 1854 (in Mediaș).

Between 1964 and 2024 I made phenological observations in 70 localities in 11 counties. Of course, being the only observer, I could only write down the species from one or two localities on the same day, in rare cases three or more.

In table 1 I have noted the flowering phenology of 330 species of the natural flora of Sibiu. The calendar dates when the first flowering specimens were seen by me are printed in italics, and the dates of mass flowering, i.e. over 50% of individuals in flower are noted in bold.

The observations were made most often between February 1st and June 15th, most of them being made in the neighbourhoods/areas of Sub Arini, Military School, Dumbrava, Ștrand, and Butchers' Plain.

RESULTS AND DISCUSSION

Sightings were more frequent in some plant species and rarer in others. Thus, 61 plant species were reported in 11 to 20 years, and 269 plant species in one to 10 years.

Differences between the date of flowering of the first individuals and mass flowering are 1-3 days in over 50% of the species, 4-7 days in 30%, 8-13 days in 8% and over 13 days in 7%. From the beginning of flowering to mass flowering there are, on average, seven days. Small differences (of 1-2 days) are seen in *Lamium album, Lamium amplexicaule, Lamium maculatum, Convallaria majalis, Ranunculus repens, Cerastium holosteoides, Dentaria bulbifera, Medicago lupulina, Berteroa incana, Viola arvensis, Lathyrus vernus, Thlaspi perfoliatum* and *Anemone nemorosa.* In *Prunus spinosa, Potentilla arenaria, Tussilago farfara* and *Ranunculus ficaria* (Fig. 1) the differences were up to 10-13 days. Mass flowering (50%) is, depending on the species and (micro)climate, 3-10 days after the observation of the first flowering individuals.

This time interval varies, influenced by climatic factors, in particular (early or late springs, heavy or little snowfall, frost or warm winter months, mists, rains, drought etc.). We exemplify with some more relevant phenomena:

– 20.04. 2017 snowed all day;

– on 25.02.2018 there was frost (snowdrops froze in the garden); The cold continues (temperatures below 0 degrees) until 06.03, when after the melting of the snow, *Stellaria media* blooms (under the snow).

– in 2019 there was no snow until after the new year; towards the end of January and the beginning of February, the weather was spring-like, with high temperatures of over 15 degrees (in 03.02, the highest temperatures since measurements have been made in Romania); on 01.02.2019 *Stellaria media* was in bloom.

– on 27-28.2020 the first magnolia flowers opened, which on March 29/30 froze, browned and fell; it snows on April 3-4 and a layer of more than 10 cm is deposited; cold, some plants freeze.

– 2023 very hot. The hottest summer and autumn months with many daily temperatures above 25 degrees.

– in 2024, very high daily and monthly temperatures, which could make 2024 the hottest year since meteorological measurements have been made in the studied area.

Figure 1: *Ranunculus ficaria*.

Table 1: Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
1.	*Galanthus nivalis*	50°C	*17*			*07.02* **15.02**	*22.02* **26.02**	*14.02* **16.02**	*20.02* **25.02**
2.	*Helleborus purpurascens*	70°C	*15*			*14.02* **22.02**	*22.02* **29.02**	*03.03* **04.03**	*20.02* **27.02**
3.	*Tussilago farfara*	85°C	*20*	*02.03*	*28.02*	*10.02* **27.02**	*01.03* **01.03**	*22.02* **06.03**	*01.03* **01.03**
4.	*Capsella bursa-pastoris*	120°C	*18*	*02.03*		**06.03**	*09.03* **09.03**	*22.02* **21.03**	*08.03* **20.03**
5.	*Veronica opaca*	120°C	*17*			**06.03**	*03.03* **08.03**	*22.02* **18.03**	*08.03* **20.03**
6.	*Viola odorata*	120°C	*15*			**06.03**	*08..03* **09.03**	***12.03*** **20.03**	*18.03* **20.03**
7.	*Potentilla arenaria*	130°C	*10*			**30.03**	**10.03**	**23.03**	**21.03**
8.	*Scilla bifolia*	85°C	*17*			*03.03* **04.03**	*03.03* **07.03**	*05.03* **06.03**	*01.03* **01.03**
9.	*Stellaria media*	115°C	*20*	*02.03*	*05.03*	*06.03* **28.03**	*08.03* **08.03**	*05.03* **17.03**	*15.03* **19.03**
10.	*Bellis perennis*	145°C	*19*		*05.03*	*02.03* **09.03**	*10.03* **12.03**	*20.03* **28.03**	*15.03* **22.03**
11.	*Crocus heuffelianus*	130°C	*18*			*14.03* **25.03**	*10.03* **10.03**	*05.03* **07.03**	*02.03* **02.03**
12.	*Lamium purpureum*	130°C	*18*	*11.03*		*07.03* **07.03**	*11.03* **10.03**	*12.03*	
13.	*Pulmonaria officinalis*	195°C	*16*			*10.03* **12.03**	*15.03* **16.03**		
14.	*Ranunculus ficaria*	200°C	*18*	*25.03*		*14.03* **17.03**	*20.03* **22.03**		*27.03*
15.	*Cerastium semidecandrum*	130°C	*5*			*18.03* **30.03**	*10.03* **10.03**		
16.	*Senecio vulgaris*	185°C	*14*			*10.01* **09.04**	*18.03* **18.03**	*12.03*	
17.	*Adonis vernalis*	130°C	*3*			*06.03* **07.03**	*09.03* **10.03**		
18.	*Isopyrum thalictroides*	150°C	*16*			*06.03* **01.04**	*11.03* **12.03**	*15.03*	
19.	*Gagea lutea*	140°C	*18*			*15.03* **31.03**	*10.03* **12.03**	*15.03*	*30.03*
20.	*Anemone ranunculoides*	180°C	*20*	*25.03*	*22.03*	*11.03* **15.03**	*15.03* **19.03**	***15.03***	*28.03*
21.	*Hepatica nobilis*	185°C	*12*			*07.03* **08.04**			
22.	*Anemone nemorosa*	170°C	*19*	*25.03*		*12.03* **15.03**	*16.03* **17.03**	*25.03*	*30.03*
23.	*Gagea arvensis*	180°C	*5*			*02.04* **08.04**	*16.03* **17.03**		
24.	*Taraxacum officinale*	210°C	*19*		*25.03*	*18.03* **19.03**	*22.03* **23.03**	*25.03*	*30.03*
25.	*Erodium cicutarium*	210°C	*9*			*10.03* **19.03**	*22.03* **22.03**		*24.03*
26.	*Veronica hederifolia*	185°C	*14*			*17.03* **17.03**	*06.03* **19.03**	*20..03*	*21.03*
27.	*Euphorbia cyparissias*	220°C	*16*			*18.03* **20.03**	*22.03* **25.03**		
28.	*Asarum europaeum*	170°C	*2*			*11.03* **12.03**	*15.03* **15.03**		
29.	*Erophila verna*	230°C	*14*			**21.03**	**27.03**		
30.	*Prunus cerasifera*	285°C	*17*			*20.03* **24.03**	*04.04* **04.04**		*04.04*
31.	*Thlaspi perfoliatum*	260°C	*11*			*23.03* **25.03**	*31.03* **31.03**		
32.	*Lamium maculatum*	250°C	*18*	*25.03*		*24.03* **24.03**	*15.03* **30.03**		*27.03*
33.	*Carex caryophyllea*	250°C	*13*			*23.03* **24.03**	*22.03* **29.03**		

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
34.	*Glechoma hederacea*	255°C	*16*			*20.03* **25.03**	*25.03* **31.03**	*05.04*	
35.	*Vinca herbacea*	250°C	*15*			*13.03* **24.03**	*30.03* **30.03**		*27.03*
36.	*Lathyrus vernus*	260°C	*3*			*15.03* **25.03**	*30.03* **31.03**		
37.	*Euphorbia amygdaloides*	265°C	*15*			*23.03* **26.03**	*30.03* **01.04**		
38.	*Prunus spinosa*	400°C	*17*			*19.03* **16.04**	*09.04* **14.04**	*05.04*	*06.04*
39.	*Caltha palustris*	375°C	*15*		*25.03*	*25.03* **04.04**	*08.04* **08.04**		
40.	*Primula veris*	375°C	*14*			*13.03* **09.04**	*09.04* **12.04**		
41.	*Fragaria viridis*	375°C	*9*			*13.04* **13.04**	*09.04* **11.04**		
42.	*Anchusa officinalis*	340°C	*7*			*02.04* **06.04**	*09.04* **09.04**		
43.	*Euphorbia angulata*	375°C	*2*			*23.03* **06.04**	*08.04* **09.04**		
44.	*Ajuga reptans*	385°C	*14*			*02.04* **09.04**	*08.04* **11.04**		
45.	*Galeobdolon luteum*	360°C	*15*		*28.04*	*08.04* **08.04**	*15.04* **11.04**		*10.04*
46.	*Stellaria holostea*	350°C	*8*			*03.04* **07.04**	*10.04*		
47.	*Lamium album*	340°C	*18*	*25.03*		*24.03* **06.04**	*05.04* **09.04**		*04.04*
48.	*Ranunculus fallax*	340°C	*2*			*10.04* **28.04**	***08.04*** **09.04**		
49.	*Diplotaxis muralis*	375°C	*13*			*06.04* **10.04**	*08.04* **12.04**		
50.	*Pyrus pyraster*	380°C	*9*	*25.03*		*08.04* **10.04**	*08.04* **12.04**		
51.	*Cerastium holosteoides*	430°C	*14*			*01.04* **13.04**	*10.04* **14.04**		
52.	*Alliaria petiolata*	400°C	*10*		*28.04*	*05.04* **12.04**	*12.04* **13.04**		*20.04*
53.	*Viola reichenbachiana*	385°C	*12*			*08.04* **09.04**	*10.04* **11.04**		
54.	*Ajuga genevensis*	400°C	*10*			*12.04* **13.04**	*12.04* **14.04**		
55.	*Fragaria vesca*	420°C	*15*			*03.04* **13.04**	*10.04* **16.04**		
56.	*Chelidonium majus*	375°C	*18*		*28.04*	*09.04* **09.04**	*12.04* **11.04**		*12.04*
57.	*Ranunculus auricomus*	430°C	*9*			*08.04* **14.04**	*12.04* **17.04**		
58.	*Lepidium campestre*	420°C	*13*			*09.04* **13.04**	*12.04* **16.04**		
59.	*Onobrychis viciaefolia*	420°C	*8*	*25.03*		*15.04* **15.04**	*16.04* **17.04**		
60.	*Cruciata glabra*	375°C	*15*		*28.04*	*08.04* **09.04**	*10.04* **11.04**	*20.04*	*18.04*
61.	*Ranunculus cassubicus*	410°C	*3*			*09.04* **13.04**	*13.04* **16.04**		
62.	*Lamium amplexicaule*	395°C	*9*			*08.04* **11.04**	*10.04* **13.04**		*17.04*
63.	*Veronica chamaedrys*	370°C	*17*	*26.04*		*04.04* **12.04**	*10.04* **13.04**		
64.	*Lycium barbarum*	440°C	*5*			*15.04* **17.04**	*19.04* **19.04**		
65.	*Myosotis arvensis*	560°C	*12*	*26.04*		*02.04* **26.04**	*27.04* **28.04**		
66.	*Malus sylvestris*	425°C	*9*			*14.04* **14.04**	*15.04* **16.04**		
67.	*Dentaria bulbifera*	435°C	*9*		*18.04*	*14.04* **15.04**	*15.04* **17.04**		

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
68.	*Mercurialis perennis*	450°C	*8*			*17.04* **17.04**	*17.04* **19.04**		*25.04*
69.	*Lithospermum arvense*	570°C	*9*			*27.04* **29.04**	*27.04* **30.04**		
70.	*Geranium phaeum*	525°C	*17*	*26.04*		*12.04* **21.04**	*22.04* **22.04**		*30.04*
71.	*Lepidium draba*	495°C	*15*			*05.04* **21.04**	*20.04* **22.04**		
72.	*Medicago lupulina*	575°C	*14*		*28.04*	*15.04* **25.04**	*25.04* **26.04**		
73.	*Veronica prostrata*	485°C	*12*			*18.04* **21.04**	**22.04**	-	
74.	*Convallaria majalis*	460°C	*16*			*13.04* **19.04**	*21.04* **21.04**		
75.	*Ranunculus repens*	460°C	*17*	*26.04*		*18.04* **18.04**	*19.04* **20.04**		*25.04*
76.	*Ranunculus acris*	515°C	*18*	*26.04*		*14.04* **22.04**	*15.04* **23.04**		*27.04*
77.	*Ornithogalum divergens*	495°C	*13*			*20.04* **22.04**	*23.04* **23.04**		
78.	*Potentilla recta*	540°C	*4*		*28.04*				
79.	*Berteroa incana*	575°C	*5*			*27.04* **29.04**	*01.05* **01.05**		
80.	*Cruciata laevipes*	485°C	*12*		*28.04*	*08.04* **22.04**	*22.04* **23.04**		*22.04*
81.	*Plantago lanceolata*	510°C	*8*			*22.04* **23.04**	*24.04* **24.04**		
82.	*Rorippa sylvestris*	480°C	*10*		*28.04*	*20.04* **20.04**	*21.04* **22.04**		*30.04*
83.	*Viola arvensis*	535°C	*6*				*24.04* **26.04**		
84.	*Veronica serpyllifolia*	525°C	*5*	*26.04*					
85.	*Ranunculus sceleratus*	520°C	*4*			*24.04* **25.04**			
86.	*Valerianella locusta*	555°C	*4*			*19.04* **27.04**	*28.04* **28.04**		
87.	*Vicia sepium*	560°C	*6*			*25.04* **28.04**	*28.04* **29.04**		
88.	*Symphytum officinale*	535°C	*10*	*03.05*		*15.04* **25.04**	*23.04* **26.04**		*30.04*
89.	*Verbascum phoeniceum*	550°C	*7*			*22.04* **26.04**	*28.04* **28.04**		
90.	*Euonymus verrucosa*	665°C	*7*			*05.05* **05.05**	*05.05* **07.05**	*10.05*	
91.	*Trifolium repens*	635°C	*16*	*03.05*		*02.05* **04.05**			*01.05*
92.	*Euonymus europaea*	600°C	*9*			*25.04* **29.04**	*29.04* **30.04**		
93.	*Ranunculus sardous*	535°C	*5*			*01.05* **02.05**			
94.	*Trifolium pratense*	660°C	*17*			*30.04* **11.05**	*03.05* **06.05**	*05.05*	*05.05*
95.	*Salvia pratensis*	595°C	*12*		*09.05*	*22.04* **28.04**			
96.	*Verbascum phlomoides*	620°C	*7*			*03.05* **08.05**			
97.	*Geum urbanum*	620°C	*16*	*03.05*		*01.05* **03.05**	*03.05* **04.05**	*05.05*	*02.05*
98.	*Geranium pusillum*	635°C	*7*			*20.04* **27.04**			
99.	*Crataegus monogyna*	625°C	*16*			*01.05* **02.05**		*10.05*	
100.	*Lychnis flos-cuculi*		*7*		*09.05*				
101.	*Sinapis arvensis*		*12*		*09.05*				
102.	*Allysum allysoides*		*6*						
103.	*Conium maculatum*		*8*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
104.	*Polygala vulgaris*		*2*						
105.	*Silene alba*		*10*						
106.	*Myosotis scorpioides*		*8*						
107.	*Reseda lutea*		*8*						
108.	*Sambucus nigra*		*3*						
109.	*Ranunculus arvensis*		*4*						
110.	*Fumaria schleicheri*		*7*						
111.	*Polygonatum odoratum*		*11*						
112.	*Cerinthe minor*		*3*						
113.	*Potentilla anserina*		*9*						
114.	*Genistella sagittalis*		*7*						
115.	*Pimpinella saxifraga*		*6*						
116.	*Hieracium bauhini*		*5*						
117.	*Melittis mellissophyllum*		*2*						
118.	*Carum carvi*		*7*						
119.	*Thymus glabrescens*		*3*						
120.	*Thesium linophylon*		*2*						
121.	*Matricaria chamomilla*		*8*						
122.	*Plantago media*		*10*						
123.	*Cynoglossum officinale*		*3*						
124.	*Scrophularia nodosa*		*7*						
125.	*Hieracium pilosella*		*7*						
126.	*Erigeron acris*		*2*						
127.	*Galium aparine*		*8*						
128.	*Robinia pseudacacia*		*10*						
129.	*Cornus sanguinea*		*7*						
130.	*Lotus corniculatus*		*7*						
131.	*Armoracia rusticana*		*7*						
132.	*Rhinanthus minor*		*5*						
133.	*Crepis biennis*		*7*						
134.	*Rumex acetosa*		*8*						
135.	*Melampyrum arvense*		*6*						
136.	*Papaver dubium*		*6*						
137.	*Physalis alkekengi*		*6*						
138.	*Anagallis arvensis*		*7*						
139.	*Ligustrum vulgare*		*10*						
140.	*Convolvulus arvensis*		*9*						
141.	*Hieracium auricula*		*4*						
142.	*Centaurea cyanus*		*5*						
143.	*Helianthemum nummularium*		*2*						
144.	*Papaver rhoeas*		*8*						
145.	*Myosotis micrantha*		*5*						
146.	*Rosa canina*		*10*						
147.	*Tragopogon orientalis*		*8*						
148.	*Rubus caesius*		*8*						
149.	*Thalictrum aquilegifolium*		*1*						
150.	*Vincetoxicum hirundinaria*		*2*						
151.	*Trifolium montanum*		*5*						
152.	*Malva sylvestris*		*10*						
153.	*Leucanthemum vulgare*		*9*						
154.	*Anthemis arvensis*		*6*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
155.	*Campanula patula*		*5*						
156.	*Vicia cracca*		*8*						
157.	*Filipendula vulgaris*		*4*						
158.	*Heracleum sphondylium*		*6*						
159.	*Platanthera bifolia*		*1*						
160.	*Potentilla argentea*		*9*						
161.	*Stellaria graminea*		*6*						
162.	*Erigeron annuus*		*9*						
163.	*Achillea millefolium*		*9*						
164.	*Lysimachia nummularia*		*7*						
165.	*Medicago sativa*		*8*						
166.	*Galinsoga parviflora*		*9*						
167.	*Potentilla reptans*		*9*						
168.	*Medicago falcata*		*4*						
169.	*Consolida regalis*		*5*						
170.	*Echium vulgare*		*5*						
171.	*Coronilla varia*		*3*						
172.	*Lathyrus aphaca*		*3*						
173.	*Caucalis platycarpos*		*1*						
174.	*Salvia verticillata*		*6*						
175.	*Campanula persicifolia*		*2*						
176.	*Malva neglecta*		*3*						
177.	*Knautia arvensis*		*3*						
178.	*Lychnis viscaria*		*5*						
179.	*Stachys annua*		*1*						
180.	*Dianthus carthusianorum*		*6*						
181.	*Lathyrus tuberosus*		*4*						
182.	*Prunella vulgaris*		*7*						
183.	*Lapsana communis*		*8*						
184.	*Linaria vulgaris*		*5*						
185.	*Aristolochia clematitis*		*3*						
186.	*Leonurus cardiaca*		*3*						
187.	*Polygonum persicaria*		*5*						
188.	*Anthyllis vulneraria*		*2*						
189.	*Epilobium angustifolium*		*4*						
190.	*Hypericum perforatum*		*5*						
191.	*Scutellaria galericulata*		*2*						
192.	*Trifolium alpestre*		*1*						
193.	*Cichorium intybus*		*8*						
194.	*Silene vulgaris*		*6*						
195.	*Digitalis grandiflora*		*3*						
196.	*Stachys sylvatica*		*2*						
197.	*Angelica sylvestris*		*3*						
198.	*Lathyrus pratensis*		*2*						
199.	*Ononis arvensis*		*2*						
200.	*Sambucus ebulus*		*2*						
201.	*Geranium pratense*		*3*						
202.	*Euphorbia helioscopia*		*2*						
203.	*Dorycnium herbaceum*		*1*						
204.	*Melilotus officinalis*		*5*						
205.	*Galium verum*		*5*						
206.	*Lysimachia vulgaris*		*1*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
207.	*Daucus carota*		*6*						
208.	*Genista tinctoria*		*2*						
209.	*Campanula rapunculoides*		*3*						
210.	*Cerasus avium*		*7*						
211.	*Bunias orientalis*		*4*						
212.	*Erythronium dens-canis*		*3*						
213.	*Corydalis cava*		*7*						
214.	*Corydalis solida*		*5*						
215.	*Cardamine pratensis*		*8*						
216.	*Adoxa moschatellina*		*3*						
217.	*Prunus padus*		*10*						
218.	*Oxalis corniculata*		*9*						
219.	*Anthriscus sylvestris*		*6*						
220.	*Matricaria matricarioides*		*3*						
221.	*Aegopodium podagraria*		*9*						
222.	*Rorippa austriaca*		*6*						
223.	*Leontodon hispidus*		*6*						
224.	*Galium mollugo*		*6*						
225.	*Vicia grandiflora*		*4*						
226.	*Galium odoratum*		*6*						
227.	*Thlaspi arvense*		*6*						
228.	*Sonchus oleraceus*		*7*						
229.	*Chrysosplenium alternifolium*		*5*						
230.	*Fumaria rostellata*		*1*						
231.	*Glechoma hirsuta*		*6*						
232.	*Poa annua*		*7*						
233.	*Stellaria nemorum*		*5*						
234.	*Cardamine flexuosa*		*6*						
235.	*Vicia angustifolia*		*5*						
236.	*Carex vulpina*		*9*						
237.	*Dactylis glomerata*		*6*						
238.	*Luzula campestris*		*4*						
239.	*Brassica rapa*		*7*						
240.	*Barbaraea vulgaris*		*8*						
241.	*Descurainia sophia*		*10*						
242.	*Anthoxanthum odoratum*		*5*						
243.	*Cardamine amara*		*5*						
244.	*Carex tomentosa*		*6*						
245.	*Draba nemorosa*		*8*						
246.	*Alopecurus pratensis*		*7*						
247.	*Carex acuta (C. gracilis)*		*6*						
248.	*Paris quadrifolia*		*6*						
249.	*Roripa pyrenaica*		*2*						
250.	*Thymaelea passerina*		*3*						
251.	*Polygonatum multiflorum*		*7*						
252.	*Vinca minor*		*1*						
253.	*Majanthemum bifolium*		*2*						
254.	*Rumex acetosella*		*4*						
255.	*Viola tricolor*		*4*						
256.	*Lepidium ruderale*		*5*						
257.	*Malva pusilla*		*2*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
258.	*Crepis tectorum*		*6*						
259.	*Solanum dulcamara*		*3*						
260.	*Moehringia trinervia*		*5*						
261.	*Hieracium cymosum*		*1*						
262.	*Trifolium ochroleucum*		*1*						
263.	*Galinsoga ciliata*		*3*						
264.	*Cirsium arvense*		*6*						
265.	*Verbena officinalis*		*8*						
266.	*Melilotus albus*		*4*						
267.	*Camelina microcarpa*		*1*						
268.	*Verbascum blattaria*		*5*						
269.	*Tilia platyphyllos*		*7*						
270.	*Juncus effusus*		*4*						
271.	*Clinopodium vulgare*		*5*						
272.	*Impatiens noli-tangere*		*2*						
273.	*Acinos arvensis*		*2*						
274.	*Datura stramonium*		*3*						
275.	*Carex hirta*		*8*						
276.	*Arenaria serpyllifolia*		*10*						
277.	*Veronica arvensis*		*6*						
278.	*Poa pratensis*		*8*						
279.	*Listera ovata*		*1*						
280.	*Astragalus glycyphyllos*		*3*						
281.	*Dactylorrhiza maculata*		*3*						
282.	*Chaerophyllum hirsutum*		*2*						
283.	*Vicia tetrasperma*		*3*						
284.	*Centaurea jacea*		*2*						
285.	*Carduus acanthoides*		*3*						
286.	*Onopordon acanthium*		*2*						
287.	*Stachys recta*		*3*						
288.	*Asperula cynanchica*		*3*						
289.	*Sedum acre*		*1*						
290.	*Campanula sibirica*		*1*						
291.	*Teucrium chamaedrys*		*4*						
292.	*Oenothera biennis*		*2*						
293.	*Lathraea squamaria*		*1*						
294.	*Carex digitata*		*1*						
295.	*Salvia nemorosa*		*6*						
296.	*Sisymbrium loeselii*		*2*						
297.	*Cardamine impatiens*		*2*						
298.	*Myosotis sparsiflora*		*2*						
299.	*Viola canina*		*3*						
300.	*Euphorbia palustris*		*1*						
301.	*Carex distans*		*3*						
302.	*Scutellaria hastifolia*		*2*						
303.	*Selinum carvifolia*		*1*						
304.	*Scabiosa ochroleuca*		*1*						
305.	*Melampyrum bihariense*		*2*						
306.	*Rhinanthus rumelicus*		*1*						
307.	*Geranium sanguineum*		*1*						
308.	*Cymbalaria muralis*		*1*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2005	2006	2007	2008	2009	2010
309.	*Acer negundo*		*1*						
310.	*Myagrum perfoliatum*		*1*						
311.	*Vicia lathyroides*		*1*						
312.	*Fumaria vailanthii*		*4*						
313.	*Rumex crispus*		*2*						
314.	*Geranium robertianum*		*7*						
315.	*Stachys germanica*		*2*						
316.	*Salvia austriaca*		*1*						
317.	*Potentilla thuringiaca*		*2*						
318.	*Vicia hirsuta*		*5*						
319.	*Holcus lanatus*		*6*						
320.	*Spiraea ulmifolia*		*5*						
321.	*Salvia austriaca*		*1*						
322.	*Potentilla thuringiaca*		*2*						
323.	*Vicia hirsuta*		*5*						
324.	*Holcus lanatus*		*6*						
325.	*Spiraea ulmifolia*		*5*						
326.	*Veronica beccabunga*		*6*						
327.	*Acer platanoides*		*2*						
328.	*Veronica officinalis*		*2*						
329.	*Trifolium campestre*		*3*						
330.	*Leontodon autumnalis*		*3*						
331.	*Filipendula ulmaria*		*2*						
332.	*Ballota nigra*		*3*						
333.	*Calystegia sepium*		*2*						
334.	*Agropyron repens*		*2*						
335.	*Sonchus arvensis*		*3*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
1.	*Galanthus nivalis*	50°C	17	*17.02* **17.02**	*18.02* **18.02**	*13.02* **22.02**		*20.02*	*08.02*
2.	*Helleborus purpurascens*	70°C	*15*	*19.02* **19.02**	***14.03*** **20.03**	*22.02* **25.02**		*03.03*	*25.02*
3.	*Tussilago farfara*	85°C	*20*	*03.03* **11.03**	*10.03* **21.03**	*01.03* **01.03**	*01.03*	*08.03*	*20.02*
4.	*Capsella bursa-pastoris*	120°C	*18*	*12.03* **12.03**	*14.03* **16.03**	*13.03.* **25.03**	*20.02*	*28.02*	*18.02*
5.	*Veronica opaca*	120°C	*17*	***01.03*** 06.03	*08.03* **24.03**	*06.03* **09.03**	*10.02*	*25.02*	*18.02*
6.	*Viola odorata*	120°C	*15*	*18.03* **26.03**	*21.03* **24.03**	*10.03* **10.03**	*02.03*	*02.03*	*25.02*
7.	*Potentilla arenaria*	130°C	*10*	*15.03* **17.03**	 **25.03**	*10.03* **11.03**		*16.03*	*09.03*
8.	*Scilla bifolia*	85°C	*17*	*07.03* **11.03**	*21.03* **24.03**	*01.03* **01.03**		*03.03*	*27.02*
9.	*Stellaria media*	115°C	*20*	*03.03* **15.03**	*16.03* **24.03**	*06.03* **09.03**	*03.01* *12.02*	*23.02*	*18.02*
10.	*Bellis perennis*	145°C	*19*	*03.03* **18.03**	*27.03* **28.03**	*10.03* **12.03**	*20.02*	*01.03*	*15.02*
11.	*Crocus heuffelianus*	130°C	18	*11.03* **12.03**	*16.03* **22.03**	*04.03* **06.03**	*01.03*	*05.03*	*27.02*
12.	*Lamium purpureum*	130°C	18	*20.02*	*20.03*	*11.03*	*20.02*	*05.03*	*15.02*
13.	*Pulmonaria officinalis*	195°C	16	*14.03*	*07.04*	*01.04*	*04.03*	*10.03*	*06.03*
14.	*Ranunculus ficaria*	200°C	18	*28.03*	*30.03*	*01.04*	*02.03*	*24.03*	*17.03*

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	*Species*	Therm. index	Years of observation	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
15.	*Cerastium semidecandrum*	130°C	5						*08.03*
16.	*Senecio vulgaris*	185°C	14	*28.03*		*11.03*	*12.02*	*02.03*	*02.03*
17.	*Adonis vernalis*	130°C	3		*08.04*				
18.	*Isopyrum thalictroides*	150°C	16	*21.03*	*20.03*	*17.03*	*04.03*	*10.03*	*28.02*
19.	*Gagea lutea*	140°C	18	*27.03*	*26.03*	*11.03*	*01.03*	*15.03*	*01.03*
20.	*Anemone ranunculoides*	180°C	20	*25.03*	*05.04*	*22.03*	*12.03*	*04.04*	*10.03*
21.	*Hepatica nobilis*	185°C	12		*09.04*	*20.03*	*06.03 garden*		*28.02*
22.	*Anemone nemorosa*	170 °C	*19*	*22.03* **22.03**	*08.04*	*22.03*	*08.03*	*04.04*	*08.03*
23.	*Gagea arvensis*	180°C	*5*			*26.03*			
24.	*Taraxacum officinale*	210°C	*19*	*30.03*	*07.04*	*01.04*	*16.02*	*01.03*	*11.03*
25.	*Erodium cicutarium*	210°C	*9*	*01.04*	*10.04*		*05.03*	*12.04*	*18.03*
26.	*Veronica hederifolia*	185°C	*14*	*24.03*	*16.03*	*05.03*	*01.03*	*03.03*	*17.02*
27.	*Euphorbia cyparissias*	220°C	*16*	*02.04*	*04.04*	*15.04*	*15.03*	*05.04*	*16.03*
28.	*Asarum europaeum*	170°C	*2*						
29.	*Erophila verna*	230°C	*14*	*05..04*	*07.04*	*03.04*	*06.03*	*05.04*	*18.03*
30.	*Prunus cerasifera*	285°C	*17*	*05.04*	*07.04*	*10.04*	*15.03*	*05.04*	*09.03*
31.	*Thlaspi perfoliatum*	260°C	*11*	*05.04*	*15.04*		*20.03*	*04.04*	*18.03*
32.	*Lamium maculatum*	250°C	*18*	*26.03*	*15.04*	*10.04*	*25.02*	*02.04*	*19.03*
33.	*Carex caryophyllea*	250°C	*13*	*01.04*		*03.04*	*15.03*	*20.03*	*19.03*
34.	*Glechoma hederacea*	255°C	*16*	*01.04*	*17.04*	*09.04*	*19.03*	*10.04*	*26.03*
35.	*Vinca herbacea*	250°C	*15*	*01.04*	*11.04*	*03.04*	*14.03*	*20.03*	
36.	*Lathyrus vernus*	260°C	*3*			*03.04*			
37.	*Euphorbia amygdaloides*	265°C	*15*	*08.04*	*16.04*	*03.04*	*15.03*		*16.03*
38.	*Prunus spinosa*	400°C	*17*	*08.04*	*11.04*	*18.04*	*28.03*	*04.04*	*31.03*
39.	*Caltha palustris*	375°C	*15*	*29.03*	*13.04*	*12.04*	*05.04*	*25.04*	
40.	*Primula veris*	375°C	*14*	*15.04*	*19.04*	*15.04.*	*21.03*	*21.04*	*11.03*
41.	*Fragaria viridis*	375°C	*9*	*22.04*	*01.05*		*03.04*	*02.05*	
42.	*Anchusa officinalis*	340°C	*7*		*18.04*		*03.04*	*02.05*	
43.	*Euphorbia angulata*	375°C	*2*						
44.	*Ajuga reptans*	385°C	*14*	*17.04*	*23.04*		*01.04*	*19.04*	*11.04*
45.	*Galeobdolon luteum*	360°C	*15*	*20.04*	*27.04*		*03.04*	*23.04*	
46.	*Stellaria holostea*	350°C	*8*		*03.05*		*14.04*		
47.	*Lamium album*	340°C	*18*	*06.04*	*10.04*	*15.04*	*03.03*	*23.04*	*29.03*
48.	*Ranunculus fallax*	340°C	*2*						
49.	*Diplotaxis muralis*	375°C	*13*	*18.04*	*25.04*		*12.04*		*11.04*
50.	*Pyrus pyraster*	380°C	*9*	*20.04*			*05.04*	*23.04*	
51.	*Cerastium holosteoides*	430°C	*14*	*19.04*	*25.04*		*05.04*	*12.04*	
52.	*Alliaria petiolata*	400°C	*10*	*18.04*	*20.04*		*29.03*	*10.04*	*04.04*
53.	*Viola reichenbachiana*	385°C	*12*	*18.04*	*20.04*		*05.04*	*21.04*	*11.04*
54.	*Ajuga genevensis*	400°C	*10*	*01.04*			*12.04*	*14.04*	*09.04*
55.	*Fragaria vesca*	420°C	*15*	*24.04*	*02.05*		*06.04*	*07.04*	*11.04*
56.	*Chelidonium majus*	375°C	*18*	*17.04*	*12.04*	*11.04*	*27.03*	*01.04*	*29.03*
57.	*Ranunculus auricomus*	430°C	*9*	*18.04*	*25.04*				*07.04*
58.	*Lepidium campestre*	420°C	*13*	*29.04*	*20.04*		*06.04*	*22.04*	*11.04*
59.	*Onobrychis viciaefolia*	420°C	*8*		*20.04*		*18.04*		

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
60.	*Cruciata glabra*	375°C	*15*	*22.04*	*20.04*		*14.04*	*17.04*	
61.	*Ranunculus cassubicus*	410°C	*3*						
62.	*Lamium amplexicaule*	395°C	*9*	*12.04*	*17.04*	*18.04*	*07.04*	*21.04*	*19.03*
63.	*Veronica chamaedrys*	370°C	*17*	*12.04*	*25.04*	*22.04*	*05.04*	*10.04*	*06.04*
64.	*Lycium barbarum*	440°C	*5*				*18.04*		
65.	*Myosotis arvensis*	560°C	*12*	*25.04*	*03.05*		*02.04*	*09.05*	
66.	*Malus sylvestris*	425°C	*9*	*25.04*			*05.04*	*22.04*	
67.	*Dentaria bulbifera*	435°C	*9*					*22.04*	
68.	*Mercurialis perennis*	450°C	*8*		*29.04*				
69.	*Lithospermum arvense*	570°C	*9*		*09.05*		*01.04*	*27.04*	*07.04*
70.	*Geranium phaeum*	525°C	*17*	*28.04*	*04.05*	*23.04*	*10.04*	*27.04*	*13.04*
71.	*Lepidium draba*	495°C	*15*	*21.04*	*30.04*	*26.04*	*12.04*	*29.04*	*11.04*
72.	*Medicago lupulina*	575°C	*14*	*26.04*	*04.05*	*05.05*	*11.04*	*02.05*	*28.04*
73.	*Veronica prostrata*	485°C	*12*	*01.05*			*09.04*	*←02.05*	
74.	*Convallaria majalis*	460°C	*16*	*24.04*	*29.04*	*28.04*	*11.04*	*29.04*	*15.04*
75.	*Ranunculus repens*	460°C	*17*		*29.04*	*01.05*	*11.04*	*11.04*	*07.04*
76.	*Ranunculus acris*	515°C	*18*	*03.05*	*01.05*	*27.04*	*13.04*	*02.05*	*07.04*
77.	*Ornithogalum divergens*	495°C	*13*	*24.04*	*01.05*	*01.05*			
78.	*Potentilla recta*	540°C	*4*	*24.05*				17.05	09.05
79.	*Berteroa incana*	575°C	*5*	**25.04**	*09.05*		15.04		
80.	*Cruciata laevipes*	485°C	*12*	*24.04*	*27.04*	*16.04*	*08.04*	*23.04*	*07.04*
81.	*Plantago lanceolata*	510°C	*8*	*25.04*	*01.05*	*27.04*	*16.04*	*17.05*	*25.04*
82.	*Rorippa sylvestris*	480°C	*10*	*25.04*	*05.05*	*27.04*	*23.04*	*02.05*	*27.04*
83.	*Viola arvensis*	535°C	*6*	*19.04*	*03.05*	*27.04*	*15.04*		*20.04*
84.	*Veronica serpyllifolia*	525°C	*5*	*03.05*	*29.04*		*16.04*		*20.04*
85.	*Ranunculus sceleratus*	520°C	*4*	*24.04*	*02.05*		*02.05*		
86.	*Valerianella locusta*	555°C	*4*		*15.05*		*15.04*		
87.	*Vicia sepium*	560°C	*6*	*29.04*		*03.05*	*18.04*	*10.05*	
88.	*Symphytum officinale*	535°C	*10*	*25.04*	*04.05*	*09.05*	*15.04*	*03.05*	*25.04*
89.	*Verbascum phoeniceum*	550°C	*7*	*30.04*	*06.05*			*07.05*	
90.	*Euonymus verrucosa*	665°C	*7*	*05.05*		*09.05*	*05.05*		*05.05*
91.	*Trifolium repens*	635°C	*16*	*25.04*	*15.05*	*09.05*	*15.04*	*08.05*	
92.	*Euonymus europaea*	600°C	*9*	*08.05*	*02.05*	*05.05*	*20.04*	*15.05*	*19.04*
93.	*Ranunculus sardous*	535°C	*5*	*23.04*		*01.05*	*23.04*	*12.05*	
94.	*Trifolium pratense*	660°C	*17*		*02.05*	*09.05*	*18.04*	*09.05*	*28.04*
95.	*Salvia pratensis*	595°C	*12*	*01.05*	*10.05*			*07.05*	*05.05*
96.	*Verbascum phlomoides*	620°C	*7*		*16.05*	*12.05*			
97.	*Geum urbanum*	620°C	*16*	*12.05*	*05.05*	*09.05*	*05.05*	*11.05*	*29.04*
98.	*Geranium pusillum*	635°C	*7*	*25.04*	*05.05*	*09.05*	*19.04*	*28.04*	*21.04*
99.	*Crataegus monogyna*	625°C	*16*	*05.05*	*07.05*	*02.05*	*23.04*	*07.05*	
100.	*Lychnis flos-cuculi*		*7*				*05.05*	*11.05*	
101.	*Sinapis arvensis*		*12*				*22.04*	*17.05*	*05.05*
102.	*Allysum allysoides*		*6*				*15.04*	*07.05*	*05.05*
103.	*Conium maculatum*		*8*				*07.05*	*10.05*	
104.	*Polygala vulgaris*		*2*						*09.05*
105.	*Silene alba*		*10*				*27.04*	*10.05*	*29.04*
106.	*Myosotis scorpioides*		*8*				*15.04*		*28.04*
107.	*Reseda lutea*		*8*				*16.04*	*10.05*	

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
108.	*Sambucus nigra*		*3*				*27.04*	*07.05*	*01.05*
109.	*Ranunculus arvensis*		*4*				*01.05*	*20.05*	
110.	*Fumaria schleicheri*		*7*					*17.05*	
111.	*Polygonatum odoratum*		*11*				*05.05*	*07.05*	*09.05*
112.	*Cerinthe minor*		*3*				*11.05*		
113.	*Potentilla anserina*		*9*				*09.05*		*05.05*
114.	*Genistella sagittalis*		*7*						*09.05*
115.	*Pimpinella saxifraga*		*6*				*05.05*		
116.	*Hieracium bauhini*		*5*				*29.04*	*17.05*	*09.05*
117.	*Melittis mellissophyllum*		*2*				*30.04*		*23.04*
118.	*Carum carvi*		*7*				*05.05*		*09.05*
119.	*Thymus glabrescens*		*3*						*09.05*
120.	*Thesium linophylon*		*2*				*11.05*	*10.05*	
121.	*Matricaria chamomilla*		*8*					*12.05*	*09.05*
122.	*Plantago media*		*10*				*23.04*	*12.05*	*09.05*
123.	*Cynoglossum officinale*		*3*				*18.05*		
124.	*Scrophularia nodosa*		*7*				*20.05*	*17.05*	*18.05*
125.	*Hieracium pilosella*		*7*				*01.05*		*09.05*
126.	*Erigeron acris*		*2*				*18.05*		
127.	*Galium aparine*		*8*				*22.04*	*20.05*	*23.04*
128.	*Robinia pseudacacia*		*10*				*05.05*	*17.05*	
129.	*Cornus sanguinea*		*7*				*28.04*	*15.05*	*30.04*
130.	*Lotus corniculatus*		*7*				*12.05*	*20.05*	*29.04*
131.	*Armoracia rusticana*		*7*					*17.05*	*03..05*
132.	*Rhinanthus minor*		*5*				*15.05*		
133.	*Crepis biennis*		*7*				*15.05*		*29.04*
134.	*Rumex acetosa*		*8*				*05.05*		*08.05*
135.	*Melampyrum arvense*		*6*				*19.05*		
136.	*Papaver dubium*		*6*					*07.05*	*13.05*
137.	*Physalis alkekengi*		*6*				*19.05*		*18.05*
138.	*Anagallis arvensis*		*7*				*15.05*	*20.05*	*16.05*
139.	*Ligustrum vulgare*		*10*				*15.05*		*05.05*
140.	*Convolvulus arvensis*		*9*				*15.05*	*17.05*	*16.05*
142.	*Hieracium auricula*		*4*				*19.05*		*18.05*
143.	*Centaurea cyanus*		*5*					*17.05*	*18.05*
144.	*Helianthemum nummularium*		*2*				*19.05*		*18.05*
145.	*Papaver rhoeas*		*8*				*15.05*	*16..05*	*16.05*
146.	*Myosotis micrantha*		*5*					*17.05*	*18.05*
147.	*Rosa canina*		*10*					*20.05*	*18.05*
148.	*Tragopogon orientalis*		*8*				*18.05*	*17.05*	*21/05*
149.	*Rubus caesius*		*8*				*22.05*		*05.05*
150.	*Thalictrum aquilegifolium*		*1*				*21.05*		
151.	*Vincetoxicum hirundinaria*		*2*				*19.05*		*18.05*
152.	*Trifolium montanum*		*5*				*15.05*		*21.05*
153.	*Malva sylvestris*		*10*				*21.05*	*17.05*	*18.05*
154.	*Leucanthemum vulgare*		*9*				*15.05*	*18.05*	
155.	*Anthemis arvensis*		*6*				*16.04*	*17.05*	

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
156.	*Campanula patula*		*5*				*19.05*	*10.05*	*21.05*
157.	*Vicia cracca*		*8*				*22.05*	*17.05*	
158.	*Filipendula vulgaris*		*4*					*12.05*	*13..05*
159.	*Heracleum sphondylium*		*6*				*31.05*		*05.06*
160.	*Platanthera bifolia*		*1*				*23.05*		
170.	*Potentilla argentea*		*9*				*20.05*	*20.05*	*18.05*
171.	*Stellaria graminea*		*6*				*20.05*	*20.05*	
172.	*Erigeron annuus*		*9*				*13.05*	*28.05*	*01.06*
173.	*Achillea millefolium*		*9*				*20.05*	*21.05*	
174.	*Lysimachia nummularia*		*7*				*27.05*		
175/	*Medicago sativa*		*8*				*27.05*	*28.05*	*21.05*
176.	*Galinsoga parviflora*		*9*				*02.06*		*01.06*
177.	*Potentilla reptans*		*9*				*29.05*	*21.05*	*21.05*
178.	*Medicago falcata*		*4*				*03.06*		*01.06*
179.	*Consolida regalis*		*5*				*18.05*		
180.	*Echium vulgare*		*5*				*19.05*	*01.06*	
181.	*Coronilla varia*		*3*				*20.05*		*25..06*
182.	*Lathyrus aphaca*		*3*				*21.05*		*30.05*
183.	*Caucalis platycarpos*		*1*				*30.05*		
184.	*Salvia verticillata*		*6*				*19.05*	*01.06*	*30.05*
185.	*Campanula persicifolia*		*2*				*21.05*		
186.	*Malva neglecta*		*3*				*31.05*		*02.06*
187.	*Knautia arvensis*		*3*				*30.05*		*28.05*
188.	*Lychnis viscaria*		*5*				*25.05*		
189.	*Stachys annua*		*1*				*26.05*		
190.	*Dianthus carthusianorum*		*6*				*19.05*		
191.	*Lathyrus tuberosus*		*4*				*31.05*	*29.05*	*03.06*
192.	*Prunella vulgaris*		*7*				*02.06*		*03.06*
193.	*Lapsana communis*		*8*				*03.06*		*01.06*
194.	*Linaria vulgaris*		*5*				*02.06*		*01.06*
195.	*Aristolochia clematitis*		*3*				*03.06*		
196.	*Leonurus cardiaca*		*3*				*03.06*	*01.06*	*03.06*
197.	*Polygonum persicaria*		*5*				*31.05*		
198.	*Anthyllis vulneraria*		*2*				*31.05*	*10.05*	
199.	*Epilobium angustifolium*		*4*				*01.06*		
200.	*Hypericum perforatum*		*5*				*02.06*		*03.06*
201.	*Scutellaria galericulata*		*2*				*25.05*		
202.	*Trifolium alpestre*		*1*				*01.06*		
203.	*Cichorium intybus*		*8*				*02.06*		*30.05*
204.	*Silene vulgaris*		*6*				*03.06*		*03.06*
205.	*Digitalis grandiflora*		*3*				*28.05*		*06.06*
206.	*Stachys sylvatica*		*2*				*02.06*		
207.	*Angelica sylvestris*		*3*				*06.06*		
208.	*Lathyrus pratensis*		*2*				*25.05*		
209.	*Ononis arvensis*		*2*				*11.06*		
210.	*Sambucus ebulus*		*2*				*06.06*		*06.06*
211.	*Geranium pratense*		*3*				*03.06*		
211.	*Euphorbia helioscopia*		*2*				*02.06*		

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
212.	*Dorycnium herbaceum*		*1*				*03.06*		
213.	*Melilotus officinalis*		*5*				*03.06*		*06.06*
214.	*Galium verum*		*5*				*19.05*		*29.05*
215.	*Lysimachia vulgaris*		*1*				*11.06*		
216.	*Daucus carota*		*6*				*03.06*		*06.06*
217.	*Genista tinctoria*		*2*						*06.06*
218.	*Campanula rapunculoides*		*3*				*05.06*		
219.	*Cerasus avium*		*7*				*28.03*	*18.04*	
220.	*Bunias orientalis*		*4*				*15.04*	*02.05*	*29.04*
221.	*Erythronium dens-canis*		*3*					*27.03*	
222.	*Corydalis cava*		*7*				*17.03*	*27.03*	
223.	*Corydalis solida*		*5*				*20.03*		*12.03*
224.	*Cardamine pratensis*		*8*				*01.04*	*25.04*	*05.04*
225.	*Adoxa moschatellina*		*3*				*03.04*	*27.03*	*19.03*
226.	*Prunus padus*		*10*				*06.04*	*28.04*	*07.04*
227.	*Oxalis corniculata*		*9*				*30.04*	*15.05*	*09.05*
228.	*Anthriscus sylvestris*		*6*				*15.04*	*06.05*	
229.	*Matricaria matricarioides*		*3*				*15.04*		
230.	*Aegopodium podagraria*		*9*				*13.05*	*18.05*	*21.05*
231.	*Rorippa austriaca*		*6*				*09.05*	*12.05*	
232.	*Leontodon hispidus*		*6*				*15.05*	*17.05*	*31.05*
233.	*Galium mollugo*		*6*				*19.05*		
234.	*Vicia grandiflora*		*4*				*16.04*		*01.05*
235.	*Galium odoratum*		*6*				*15.04*	*02.05*	*18.05*
236.	*Thlaspi arvense*		*6*				*01.04*		
237.	*Sonchus oleraceus*		*7*				*10.04*		
238.	*Chrysosplenium alternifolium*		*5*				*15.03*	*25.04*	*13.03*
239.	*Fumaria rostellata*		*1*					*01.06*	
240.	*Glechoma hirsuta*		*6*				*10.04*		
241.	*Poa annua*		*7*				*15.04*	*07.05*	*02.05*
242.	*Stellaria nemorum*		*5*				*14.04*		
243.	*Cardamine flexuosa*		*6*				*14.04*	*03.05*	*03.05*
244.	*Vicia angustifolia (nigra)*		*5*				*21.04*	*12.05*	
245.	*Carex vulpina*		*9*				*22.04*		
246.	*Dactylis glomerata*		*6*				*16.04*	*11.05*	*30.04*
247.	*Luzula campestris*		*4*					*25.04*	
248.	*Brassica rapa*		*7*				*12.04*	*03.05*	
249.	*Barbaraea vulgaris*		*8*				*18.04*	*03.05*	*15.04*
250.	*Descurainia sophia*		*10*				*16.04*	*11. .05*	
251.	*Anthoxanthum odoratum*		*5*				*15.04*	*10.05*	
252.	*Cardamine amara*		*5*				*09.04*	*28.04*	*26.04*
243.	*Carex tomentosa*		*6*				*13.04*	*03.05*	
254.	*Draba nemorosa*		*8*				*12.04*	*25.04*	
255.	*Alopecurus pratensis*		*7*				*20.04*		*15.04*
256.	*Carex acuta (C. gracilis)*		*6*				*19.04*		*15.04*
257.	*Paris quadrifolia*		*6*				*24.04*		
258.	*Roripa pyrenaica*		*2*				*16.04*		
259.	*Thymaelea passerina*		*3*						

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
260.	*Polygonatum multiflorum*		*7*				*03.05*		*07.05*
261.	*Vinca minor*		*1*						*01.03*
262.	*Majanthemum bifolium*		*2*				*24.04*		
263.	*Rumex acetosella*		*4*				*24.04*		
264.	*Viola tricolor*		*4*						*18.05*
265.	*Lepidium ruderale*		*5*				*10.05*		
266.	*Malva pusilla*		*2*				*10.05*		
267.	*Crepis tectorum*		*6*				*10.05*		
268.	*Solanum dulcamara*		*3*				*19.05*		
269.	*Moehringia trinervia*		*5*				*12.05*		
270.	*Hieracium cymosum*		*1*				*16.05*		
271.	*Trifolium ochroleucum*		*1*				*19.05*		
272.	*Galinsoga ciliata*		*3*						*24.05*
273.	*Cirsium arvense*		*6*				*02.06*	*01.06*	*03.06*
274.	*Verbena officinalis*		*8*				*30.05*	*01.06*	
275.	*Melilotus albus*		*4*				*03.06*		
276.	*Camelina microcarpa*		*1*				*19.05*		
277.	*Verbascum blattaria*		*5*				*03.06*		
278.	*Tilia platyphyllos*		*7*						*03.06*
279.	*Juncus effusus*		*4*				*03.06*		
280.	*Clinopodium vulgare*		*5*				*19.05*		
281.	*Impatiens noli-tangere*		*2*						*01.06*
282.	*Acinos arvensis*		*2*				*05.06*		
283.	*Datura stramonium*		*3*				*08.06*		*06.06*
284.	*Carex hirta*		*8*				*28.04*	*07.05*	*29.04*
285.	*Arenaria serpyllifolia*		*10*				*20.03*	*07.05*	
286.	*Veronica arvensis*		*6*				*22.04*	*03.05*	*28.04*
287.	*Poa pratensis*		*8*				*28.04*		
288.	*Listera ovata*		*1*				*29.05*		
289.	*Astragalus glycyphyllos*		*3*				*30.05*	*01.06*	*01.06*
290.	*Dactylorrhiza maculata*		*3*				*25.05*		
291.	*Chaerophyllum hirsutum*		*2*				*25.05*		
292.	*Vicia tetrasperma*		*3*				*25.05*		*01.06*
293.	*Centaurea jacea*		*2*				*05.06*		
294.	*Carduus acanthoides*		*3*				*08.06*		*06.06*
295.	*Onopordon acanthium*		*2*				*12.06*		
296.	*Stachys recta*		*3*				*19.05*		
297.	*Asperula cynanchica*		*3*				*19.05*		*10.06*
298.	*Sedum acre*		*1*				*24.05*		
299.	*Campanula sibirica*		*1*				*19.05*		
300.	*Teucrium chamaedrys*		*4*				*08.06*		*10.06*
301.	*Oenothera biennis*		*2*				*08.06*		
302.	*Lathraea squamaria*		*1*					*25.04*	
303.	*Carex digitata*		*1*					*07.05*	
304.	*Salvia nemorosa*		*6*					*17.05*	
305.	*Sisymbrium loeselii*		*2*				*12.05*		*18.05*
306.	*Cardamine impatiens*		*2*						*28.04*
307.	*Myosotis sparsiflora*		*2*						*14..05*
308.	*Viola canina*		*3*				*20.04*		

Table 1 (continued): Phenology of flowering of some species from the flora of Sibiu in the period 2005-2024.

Nr.	Species	Therm. index	Years of observation	2011	2012	2013	2014	2015	2016
309.	*Euphorbia palustris*		*1*				*21.04*		
310.	*Carex distans*		*3*						*28.04.*
311.	*Scutellaria hastifolia*		*2*				*18.05*		
312.	*Selinum carvifolia*		*1*						*18.05*
313.	*Scabiosa ochroleuca*		*1*				*18.05*		
314.	*Melampyrum bihariense*		*2*				*30.05*		
315.	*Rhinanthus rumelicus*		*2*				*19.05*		*18.05*
316.	*Geranium sanguineum*		*1*				*25.05*		
317.	*Cymbalaria muralis*		*4*				*16.03*	*25.04*	*11.04*
318.	*Acer negundo*		*1*				*28.03*		
319.	*Myagrum perfoliatum*		*1*				*21.04*		
320.	*Vicia lathyroides*		*1*				*21.04*		
321.	*Fumaria vailanthii*		*4*				*21.04*		
322.	*Rumex crispus*		*6*				*23.04*		*01.05*
323.	*Geranium robertianum*		*10*				*22.04*	*29.04*	*19.04*
324.	*Stachys germanica*		*2*				*19.05*		
325.	*Salvia austriaca*		*1*					*17.05*	
326.	*Potentilla thuringiaca*		*2*					*10.04*	
327.	*Vicia hirsuta*		*5*						
328.	*Holcus lanatus*		*6*						
329.	*Spiraea ulmifolia*		*5*						
330.	*Veronica beccabunga*		*6*						
331.	*Acer platanoides*		*2*						
332.	*Veronica officinalis*		*3*						
333.	*Trifolium campestre*		*3*						
334.	*Leontodon autumnalis*		*3*						
335.	*Filipendula ulmaria*		*3*						
336.	*Ballota nigra*		*3*						
337.	*Calystegia sepium*		*2*						
338.	*Agropyron repens*		*3*						
339.	*Sonchus arvensis*		*3*						

CONCLUSIONS

Tracking plant phenology provides insight into the evolution of micro- and macroclimatic changes, useful information in the organization of human activities.

REFERENCES

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